REMARKS

This paper is being provided in response to the Office Action mailed August 14, 2003, for the above-referenced application. In this response, Applicants have amended claims 7 and 8 in order to clarify that which Applicants deem to be the invention. Applicants respectfully submit that the amendments to the claims are all supported by the originally-filed application.

The objection to claim 8 has been addressed by claim amendments provided herein in accordance with the guidelines provided in the Office Action. Accordingly, Applicants respectfully request that this objection be withdrawn.

The rejection of claims 7-12 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,962,083 (hereinafter referred to as "Hatanaka") is hereby traversed and reconsideration thereof is respectfully requested. Applicants respectfully submit that the claims, as amended herein, are patentable over the cited reference.

As amended, claim 7 recites an apparatus for forming a silicon oxide film on a substrate by the use of a plasma CVD method. The apparatus comprises a plasma generating region which forms plasma of first gas oxygen atoms, a deposition region which is placed on a substrate so as to be separated from the plasma generating region, a grounded barrier disposed between the plasma generating region and the deposition region through which excitation oxygen molecules and excitation oxygen atoms pass into the deposition region from the plasma generating region, a supply unit which supplies second gas containing silicon atoms into the deposition region, and a control unit which controls a pressure of the deposition region and which intentionally controls first quantity of the excitation oxygen molecules and second quantity of the excitation oxygen atoms.

Claims 8-12 depend from claim 7 and recite further patentable features over the base claim. Dependent claim 8 recites that the control unit comprises a multi-channel optical emission spectrometer which has a thermoelectric cooling CCD and which spectrally detects luminescence of the deposition region. Claim 9 recites that an optical transmitting window is

arranged at the chamber wall, preferably in the deposition region, and that the optical emission spectrometer spectrally measures a light beam passing through the light transmitting window.

Claim 10 recites that the deposition region has a luminescence spectrum which is spectrally measured by the optical emission spectrometer, the excitation oxygen molecule has a first luminescent peak near 761 nm, and the excitation oxygen atom has a second luminescent peak near 777 nm. Claim 11 recites that a deposition condition is controlled such that a relationship between a first area A (O2) of a first luminescent peak and a second area A (O) of the second luminescent peak near satisfies a relation of 10 * A (O2) > A (O). Claim 12 recites that the deposition condition of claim 11 is controlled by changing pressure of the deposition region.

Hatanaka discloses a method of depositing a thin film on a polymer substrate by plasma CVD. The method included introducing a gas into a plasma generating chamber wherein an ECR (electron cyclotron resonance) plasma is generated, passing the plasma through a mesh provided between the gas inlet and a polymer substrate located downstream of the inlet, and depositing a film on the surface of the polymer substrate.

Applicants respectfully submit that Hatanaka does not anticipate independent claim 7 as amended herein. Hatanaka discloses that a silicon atom-containing feed gas is introduced upstream of a screen through which both the plasma and the gas pass. When the feed gas is introduced, it encounters a plasma that still includes electrons, negative ions, and positive ions. As the plasma passes through the screen, the ions are removed, leaving neutral atoms and radicals. In contrast, claim 7 recites that the second gas containing silicon atoms is supplied into the deposition region. The deposition region is separated from the plasma generating region by a grounded barrier through which excitation oxygen molecules and excitation oxygen atoms may pass. Because the barrier is grounded, the plasma may not pass through the barrier. As a result, according to claim 7, the second gas does not encounter the plasma until the ions have been removed therefrom, in contrast to the teachings of Hatanaka.

Claims 8-12 depend from claim 7. Claim 7 is patentable, as discussed above.

The rejection of claims 7-12 under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 5,364,665 (hereinafter referred to as "Felts") in view of U.S. Patent No. 6,044,792 (hereinafter referred to as "Ogawa") is hereby traversed and reconsideration thereof is respectfully requested. Applicants respectfully submit that the claims, as amended herein, are patentable over the cited references.

The claims are described above.

Felts discloses a plasma treating apparatus comprising an evacuable chamber, an electrically powered electrode defining a plasma-facing surface within the chamber, and a shield spaced a distance Δ transverse to the plasma-facing surface.

Ogawa discloses a continuous plasma CVD apparatus for a continuously forming a thin film on the surface of a substrate having electrical conductivity characterized by having a high-frequency self-bias generation mechanism.

Applicants respectfully submit that independent claim 7, as amended herein, is not obvious over Felts in view of Ogawa. Both Ogawa and Felts fail to disclose an apparatus having a deposition region and a plasma generating region separated by a barrier through which excitation oxygen molecules and excitation oxygen atoms pass into the deposition region, as recited in claim 7. Neither Felts nor Ogawa includes any method of preventing ions from reaching the substrate. Indeed, Ogawa envisions an apparatus in which the ions are assumed to reach a substrate, from which the charge must then be conducted by the rollers (See column 9, lines 7-15). In contrast, claim 7 recites that a grounded barrier is disposed between the plasma generating region and the deposition region. Such a barrier prevents charged particles from reaching the substrate.

Claims 8-12 depend from claim 7. Claim 7 is patentable, as discussed above.

Based on the above, Applicants respectfully request that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-248-4038.

Respectfully submitted,
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